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EDITORIAL DEPARTMENT NOTE

The articles appearing in this issue of the *Bulletin* deal with managerial problems and the accountant's part in their solution. The control of gross margins, the place of budgetary control in management and the control of capital expenditures and return on investment are subjects in which the industrial accountant is extremely interested, representing as they do areas in which the accountant can make important contributions to management.

Our first article is by William C. Wichman, Assistant Works Accountant at the Fort Wayne Plant of General Electric Co., who received the first two years of his technical training at the California Institute of Technology and graduated in Mechanical Engineering from Iowa State College in 1928. Mr. Wichman has been connected with the General Electric Company since 1928 and during that time has been associated with the Erie, Albany and Fort Wayne Chapters of N.A.C.A. He served as Program Director of the Albany Chapter for the year 1937-38 and as President of the Fort Wayne Chapter last year.

Our second article is by J. William Schultze, who has been associated with the New York World's Fair since 1936, first as Director of Methods and Planning, later as Director of Banking. Mr. Schultze is a New York C.P.A., but much of his career has been in the field of management. He has had charge of course and service of the Alexander Hamilton Institute, served as Controller of Robert H. Ingersoll Bros., been President and General Manager of Alfred Vester Sons, Inc., of Providence and, during N.R.A. served as Secretary and Managing Director of the National Processors Guild. He is the author of several books and papers on business and accounting topics and was a speaker at the 1935 National Convention.

The author of our third article is E. E. Lewis, who received his early education in England and later studied accounting and business law at Pace & Pace and special courses in economics and finance at Columbia University. His industrial experience has been gained with the Maxwell Motor Car Co., where he started as time clerk and later had charge of production control; with the Splitdorf Electric Corp., where he established a production control system; with Bijur Motor Appliance Co., where he had charge of accounts, installed a cost control and payroll system and was later elected Treasurer and transferred to the parent, General Electric Co., to visit G. E. plants and serve as an industrial analyst; with the Eclipse Aviation Corp., which he served as Production Manager and Treasurer; and with the RCA Radiotron Co. until it was consolidated with the RCA Manufacturing Co. He has served the consolidated companies as Works Accountant until recently when he became General Administrator of Accounts and Finance for the Company. Mr. Lewis is a former Director of the Newark Chapter.

Articles published in the *Bulletin* present many different viewpoints. In publishing them the Association is not sponsoring the views expressed, but is endeavoring to provide for its members material which will be helpful and stimulating. Constructive comments are welcomed and will be published in the Forum Section of the *Bulletin*.

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NOVEMBER 15, 1940

THE CONTROL OF GROSS MARGINS IN A MANUFACTURING ENTERPRISE

By William C. Wichman, Assistant Works Accountant, General Electric Co., Fort Wayne, Ind.

Plan of Organization for Financial Control

THE primary law of management in any enterprise is that responsibility for results and authority for taking such steps as are necessary to achieve those results must go hand in hand. In a small business this end may be quite easily attained, because the general manager is directly responsible to the owners for return on investment, and the actual direction of the business is vested in him. However, as the size of the enterprise increases and its products become more diversified, central control by the directing head himself tends to become more and more difficult, he is forced to delegate more and more responsibility to his subordinates. He can do this in one of two ways, or in an infinite number of combinations of the two:

A. Functionally, that is by assigning to one man the responsibility for manufacturing, to another that for engineering, and to a third that for sales. The vice president in charge of manufacturing must then set up managers of his various factories, and probably superintendents of operating departments within the factories; the vice president of engineering must delegate to chief engineers the responsibility for development and design of the various products; while the vice president in charge of sales must probably set up commercial managers for various product lines and also, if the concern is in a national market, district representatives who will be in charge of sales of all of the company's products for given localities.

B. Vertically, that is by assigning to one man the responsibility for manufacturing, engineering and sales of each product or line of products. This amounts to breaking the company up into a number of small businesses.

In the latter case, if this can be done without detriment to the position of the company in its field, or without loss of economy of

operation, the problem of financial control is tremendously simplified, in that all of the operating statements of each business can readily be prepared and each manager can be held directly responsible for his operating results. Where, however, the vertical plan is deemed inadvisable and it is necessary to set up a horizontal type of organization along broad functional lines, the problems of securing adequate financial control becomes somewhat complex. It is not the purpose of this paper to argue for or against either of the two plans, because individual circumstances peculiar to the enterprise in question will dictate this decision, but rather to describe a control setup whch is adaptable either to a small concern or to a large company operating under either of the alternative organization plans.

Responsibilities of Functional Heads

The problem in the case of the large company whose organization plan lies along functional lines will now be discussed. The president, having set up functional vice presidents, must establish certain "measuring sticks" to determine whether a satisfactory job is being done. His approach may be something like this:

MANUFACTURING—vice president held responsible for:

- Maintaining excellent labor relations
- Progress in reduction of product costs through better planning
- Maintaining sufficient manufacturing capacity
- Providing excellent service to customers
- Operating with low manufacturing losses
- Controlling indirect manufacturing expenses
- Purchasing materials economically
- Operating with low raw material and in-process inventories

ENGINEERING—vice president held responsible for:

- Keeping ahead of the field in developing new products
- Designing products of high quality and low inherent cost with low field service charges
- Controlling the expenses of his engineering organizations

SALES—vice president held responsible for:

- Obtaining a fair share of the available business
- Operating with low finished stock inventories
- Controlling the expense of distributing the product and receiving customers' orders.

(This is necessarily only a partial list, intended to be illustrative only.)

If the president holds his vice presidents responsible for satisfactory performance when judged by these criteria, a system of memorandum reporting will be set up, superimposed in most cases on the usual financial operating statistics, and those measuring sticks will be passed along down the line to subordinates who, in turn, will be judged largely on the basis of their particular contributions. As a matter of fact, in a large concern the manufacturing vice president will hold different men responsible for following the separate parts of his program. He might, for example, delegate one man to follow labor relations, another product cost reduction, another to act as purchasing agent, and so on. Each of these men will, and should, work to achieve the best possible results along the lines of his particular job.

Supplementing of Functional Controls

The obvious danger in depending entirely upon these sets of controls is that all too often, in a given situation, the results as measured by the functional yard sticks do not "add up" to maximum return on investment. Heavy purchases made to secure low unit material costs may build up inventories to a point where adequate return on capital is not secured, or may be rendered obsolete by a change in design. By high investment in capital assets, management may succeed in lowering unit labor costs but leave excess capacity. A low selling expense ratio may be maintained on large volume of unprofitable business, and so on. This is simply another way of saying that before business decisions can be made, all factors must be taken into consideration.

It is perfectly natural that in order to supplement these functional controls, the financial administrator calculates gross margin results by transaction and then by product line; that he goes a step further and allocates commercial and administrative expenses to the lines in order to determine the net margin, and still another step to allocate investment by lines so that finally the company's return on investment is segregated by product class. At this point, when the less satisfactory product classes are being examined, it will be apparent that in order to do something about the situation, responsibility for the poor result will have to be allocated in some manner. It will probably be found that the efforts of a good many individuals are partially assignable to the product and, perhaps,

that their records with respect to the functional "measuring sticks" described above are good. What, then, can be done? One answer is to form a "Management Committee" consisting of the factory superintendent in whose department the product is manufactured, the design engineer in charge, and the commercial representative whose job it is to direct the selling policies for this product. In this way we can achieve, to a remarkable degree, the proper delegation of responsibility with authority to produce results. Of course the product groupings must be such that prorations of charges are held to a bare minimum, because it will at once be apparent that the management committee can exercise little control over assessed charges.

This, then, is one answer to the problem of organization for financial control in a large company operating functionally rather than vertically:

1. Set up functional "measuring sticks" to assure progress along functional lines.
2. Break down the business into logical product groups with full responsibility for financial control vested in a management committee consisting of a manufacturing, engineering, and a commercial representative, these men all responsible to their functional heads.
3. Issue complete sets of financial operating reports for these product groups to measure effectiveness of the committees.

In the discussion which follows, it does not matter whether we are discussing a small business, a vertically segregated segment of a large business, or a segregated product grouping of a large business not decentralized vertically. They are now all "businesses."

The Profit and Loss Report

We are all familiar with the cenventional profit and loss report which exhibits the following items for which we assume certain figures:

		Amount	*% NSB*
Gross Sales		$2,050,000	
Less: Returns and Allowances		50,000	
(1) Net Sales Billed (NSB)		2,000,000	100.0%
(2) Manufacturing Cost of Sales		1,800,000	90.0
(3) Gross Margin		200,000	10.0
(4) Commercial Expense	$100,000		
(5) Administrative Expense	50,000	150,000	7.5
Net Margin		50,000	2.5%
(6) Investment		$2,500,000	
Return on Investment		2%	

This statement measures accurately the results of the operations for the period (a return on invested capital of only 2 per cent) but fails completely to show *why* they were unsatisfactory. Reasons for the poor showing are no doubt to be found in the answers to the following questions:

(1) Net Sales Billed—too low? Failure to secure adequate prices for product? Failure to get fair share of the business?
(2) Manufacturing Costs—too high?
(3) Gross Margin—too low? Result of questions (1) and (2) above? Or on account of poor distribution of business—pushing unprofitable lines, etc.?
(4) Commercial Expense—too high? Ineffective?
(5) Administrative Expense—too high? Ineffective?
(6) Investment—too high?

A few of these questions may no doubt be answered to a degree by comparison of results with those contemplated in the conventional "static" budget, but by and large this type of report simply does not spotlight the reasons for out of line performance. The pages which follow deal with the analysis of gross margin in such a way as to indicate where corrective action is needed. This approach can also be applied to commercial and administrative expenses and to investment but they are beyond the scope of this paper.

Financial Standards

Let us first consider the problem of analyzing the element "Manufacturing Cost," and as the basis for our analysis let us enunciate the following axiom: All expenditures are the result of three factors: *Design* (what to build, or what is to be done), *Planning* (how it can best be done) and *Execution* (how it is actually done). It follows that the ultimate low cost to be attained is achieved through the most economical design (or the best conceived project), properly planned (that is to say, with all necessary facilities provided, and with all operations properly laid out) and executed strictly in accordance with this plan. From this we can deduce the following laws of cost reduction and control:

1. *Set financial standards* for all elements entering into product cost.
2. *Meet current standards* by bringing pressure to bear on all deviations due to faulty execution.
3. *Reduce financial standards* through constant study of product design, materials factory processes, operations and equipment.

What, then, are these standards, which must be met currently? They are the specifications of the engineers and the instructions given the shop by the planners translated into dollars by the cost department. Briefly, they are:

(1) Direct Material—specification or drawing of part.
—quantity (weight required including planned waste).
—price (base price including transportation best way.

(2) Operation Labor—correct anticipated earned rate for occupation involved.
—operation time allowance.

(3) Machine Setup—correct anticipated earning rate and time allowance for each type of setup. Total setup cost allowed during the period expressed as a percentage of operation labor for period which represents good performance.

(4) Manufacturing losses—at a ratio of operation labor representative of good performance.

(5) Overhead—allowable expenditure at a given load, entered into product costs on a "normal volume" basis.

Breakdown of Gross Profit Variance

Assuming that these standards have been set, and that expenditures as made have been properly segregated, it is now possizle to make the profit and loss statement a very positive record of accomplishment. This is done in Exhibit 1 for the imaginary

EXHIBIT 1

ANALYSIS OF GROSS MARGIN

	Amount	% *NSB*
Net Sales Billed	$2,000,000	
Planned Mfg. Cost of Sales	1,500,000	
Planned Margin	500,000	25%
Excess Costs over Budgets		
Manufacturing Losses		
Defective Material	15,000 (—)	
Manufacturing	35,000 (—)	
Engineering	2,000	
Commercial	4,000 (—)	
Direct Labor Rates	36,000 (—)	
Direct Labor Efficiency	25,000 (—)	
Machine Set-ups	30,000 (—)	
Purchasing Efficiency	3,000	
Misc. Unapplied Costs	5,000	
Controllable Indirect Mfg. Expense	45,000 (—)	
Total Excess Costs over Budgets	180,000 (—)	9 (—)
Gross Margin—Performance Basis	320,000	16
Price & Volume Variance		
Material Prices	20,000	
Direct Labor Wage Levels	.....	
Volume Variance—Indirect Mfg. Expense	140,000 (—)	
	120,000 (—)	6 (—)
Gross Margin—Actual	$ 200,000	10%

business chosen, which shows that the gross margin of 10 percent is really made up of the following components:

	Amount	% *NSB*
Gross Margin—Planned Basis.....	$500,000	25%
Less: Excess Cost over Budgets.....	180,000 (—)	9 (—)
Gross Margin—Performance Basis.	320,000	16
Less: Price and Volume Variance.....	120,000 (—)	6 (—)
Gross Margin—Actual	$200,000	10%

The results are now set forth in such a form that the manager (or management committee) can make an intelligent decision in laying out a future course.

Since so much has been written with regard to the mechanisms by which variances are developed and the books are kept under standard cost systems, it need only be said here that this statement is prepared as the result of the operation of standard cost procedure closely paralleling that popularly (and in my opinion, erronenously) known as the "ideal" system.

Manager's Analysis of Operating Results

This section will be devoted to the analysis which the heads of the business are now able to make, and outline the remedies they will be able to suggest for situations in need of correction.

1. *Planned Margin.* As its title may suggest, this term is used to designate the gross margin which would have been obtained had all expenditures been in line with design and planning. If it is not satisfactory,

(a) Can sales department—
  (1) Obtain more money for present product?
  (2) Better the sales distribution, i. e., push the more profitable items more vigorously?
  (3) See any items which should be added to, or removed from, the line?

(b) Can engineering department—
  (1) Improve existing design from a cost standpoint?
  (2) Reduce budget of engineering expense?
  (3) Reduce budget of engineering losses or complaints?

(c) Can planning department—
  (1) Improve and simplify shop operations on present product with present equipment?
  (2) Suggest new equipment and layouts which will improve costs and give substantial return on increased investment?
  (3) Reduce budget of manufacturing losses through better methods or better standards on repair operations?
  (4) Reduce investment or floor area?
  (5) Improve methods of inspection, storekeeping, maintenance, etc.?

(d) Can clerical group—
  (1) Improve routines and procedures?
  (2) Introduce new labor saving devices?

(e) Can production and purchasing departments—
  (1) Effect economies in purchasing?
  (2) Reduce budget of machine setups through better stocking of component parts?

From these brief notes it is seen that the objective in improving planned margin from the factory standpoint is through ideas for better designs and better plans. The reason for segregating this element is obvious. If the business does not yield a satisfactory planned margin and after thorough analysis none can be seen, then either the business should be abandoned or the management group reorganized.

Since responsibility for planned margin is really joint (sales, engineering and manufacturing) it is highly desirable that a commitment be secured from each of these heads, expressed in the form of an operating budget, and that a mechanism be set up to measure the effectiveness of their separate efforts. The character of this mechanism is suggested by the fact that any changes in planned margin from one period to another (aside from cost differentials due to change in material prices and wage levels) must be due to:

(A) A change in price levels or in "distribution of business" (selling varying proportions of high or low margin items). This is definitely the responsibility of the sales department.

(B) A change in cost levels due to design or planning changes. If we "freeze" product costs at the beginning of the period and apply these costs to the sales of the period, we can then hold the sales department responsible for any change in planned margin. This assumes that new business taken during the period is included in cost of sales at the estimated figures agreed on by the management group as a whole.

"Planned Margin" may be analyzed in a number of ways, depending on the requirements of the business. Usually the line will be divided into product sub-classes, for each of which there will be set up a sales and a planned margin budget. Further it may be necessary to follow these results by principal customers.

The manufacturing and engineering heads likewise set up a "cost reduction" budget which incorporates the reduction in cost levels which can reasonably be expected to result from design and planning changes. Actual results from this activity as compared with the budget can be obtained without any great amount of added expense in the normal functioning of the cost system. There are a number of ways of accomplishing this, and the particular method depends principally on the complexity of the product and degree of repetition of orders for identical units. Basically, however, the procedure simply consists of evaluating for the actual production of the devices involved, the engineering "alteration notice" (which changes the specifications of the product) or the changed planning notice (which authorizes either a new method or a changed time allowance for an existing method of performing an operation).

2. *Excess Costs over Budgets.* It should be clear from what has gone before that up to this time we have been discussing the effect of design and planning on operating results and we now come to the third essential, which is execution, that is, the effect on operating results of the manner in which these commands are carried out.

Supplementary reports of actual expenditures compared with budgets, issued weekly in most cases, will already have been received and studied by the individuals responsible, so that each member of the management committee will be well informed as to the action which is being taken to correct any bad situations

coming under his jurisdiction. It goes almost without saying that budgets *must be met* or excesses satisfactorily explained.

It seems to me that a word with respect to budgets might not be amiss at this point. We have found that the budgets by which operating heads are to be judged must be agreed to, without qualification, by these people. Too many times a commitment is forced upon a supervisor and he can scarcely be blamed for failure to accept full responsibility for meeting it. Budgets which the man in charge does not feel he can meet can have no good effect and usually only serve to make the overall operating budget of the concern decidedly unsatisfactory. There are all too many uncertainties which must be dealt with in preparing financial budgets and to add to them the result of over-zealous commitments is simply to defeat the purpose of the budget. The advocates of that school of thought which holds that budgeted costs are simply the result of deducting a satisfactory margin from estimated sales are, in my opinion, the victims of "wish fancy" thinking, and results of this are vicious. If the combined commitments of the organization for the coming period are unsatisfactory, then they must either be given technical assistance or a "shake-up" is indicated. The decision is thus put squarely up to management.

The following comments indicate very briefly what each individual can do to reduce losses shown on Chart 1.

MANUFACTURING LOSSES

DEFECTIVE MATERIAL

Inspector must: Allow no work to be done on faulty material.
Order and Stores must: Deal with most reliable vendors giving desired price.
Handle all claims aggressively.

MANUFACTURING SPOILAGE

Foreman must: Locate operators performing faulty work and instruct for correcton.
Eliminate careless workmanship.
See that equipment is kept in first-class condition.
Keep excess waste at a minimum.

Planner must: Select equipment adequate for job quality and limits.
Select proper methods for desired quality.

EXTRA COSTS

Planner must: Insure that planning is adequate.
Foreman must: Bring failure of planned methods to attention of planner immediately.
Production must: Schedule properly to keep broken setups and other extra costs at a minimum.

OVERRUNS

Foreman must: Manufacture only specified order quantity.
Production must: Report and plan best disposition of all overruns.
Ship "long" or "short" where desirable.

ENGINEERING

Engineer must: Design to limits practical for shop to meet.
Assure himself before release that quality will be as desired if specifications are met.

COMMERCIAL

Commercial must: Satisfy customer with normal delivery dates and shop practice.

DIRECT LABOR RATES

Foreman must: Realize standard participating rates by:
(a) transfer to proper classification or reduction in rate of operators whose rate is higher than standard. This includes correction of any tendency to use men on jobs which could be performed by women.
(b) Control rate increases within limits of standard for job and efficiency.
Personnel must: Support and aid the foreman in these tasks and make sure that excellent employee relations are maintained.

DIRECT LABOR EFFICIENCY

Foreman must: Meet established time standards by:
(a) Selecting proper operators.
(b) Instructing operators on planned operations.
(c) Providing proper working conditions and accessories (jointly with planner).
(d) Eliminating excess operators from groups.
(e) Securing maximum group and individual co-operation.
Production must: Notify foreman of change in load sufficiently far in advance that the correct number of operators will be at work.
Personnel must: Co-operate with foreman by assisting with reallocation of excess operators.

PLANNED SETUPS

Foreman must: See that setups are made in the planned way.

Dispatcher must: See that scheduled quantities are manufactured.

Keep broken setups at a minimum (jointly with foreman).

Eliminate setups by combining production operations on like parts.

Combine production orders for similar parts to take full advantage of partial setups.

Production must: Utilize all parts in stock.

Requisition Drafting must: Utilize stock parts to fullest possible extent.

PURCHASING EFFICIENCY

Design Engineer must: Standardize as far as possible on raw material types and sizes.

Production must: Stock raw materials whenever this is justified and when this eliminates quantity extras or gains quantity discounts.

Eliminate express and "LCL" freight charges whenever possible by ordering sufficiently far in advance.

Order and Stores must: Supervise to see that charges are kept at a minimum.

MISCELLANEOUS UNPLANNED COSTS

Planner must: Restrict recurrent unplanned operations to a minimum consistent with amount of money involved and planning effort required.

Foreman must: Give his particular attention to close supervision of operators working on unplanned operations.

3. *Price and Volume Variances.* Market prices and wage levels are, of course, out of the control of the managers of a business, but it is their responsibility to see that every effort is made to reflect adverse price variances in selling prices.

Volume variance arises through a difference between actual load in the factory and that normal level at which overhead is fully liquidated, on the basis of which it is entered into product costs. If, over a period, it is evident that overhead is not being fully absorbed and additional volume cannot be secured, then planned costs must be increased and planned margin thereby reduced.

Taking New Business

There are, perhaps, no business decisions so important or so difficult as those dealing with the introduction of new products or the

expansion of existing lines. Yet in all fields of business today competition is exceedingly keen and the progressive management group must lead rather than follow most of the time, or sacrifice its position in the industry with consequent loss of volume and return on investment. In these days of increasing functional specialization, sales, engineering and maufacturing efforts must be co-ordinated as never before in their approach to this problem.

"New business" divides itself logically into two general classes, that primarily of a temporary nature as opposed to permanent additions to the line. It is quite generally accepted that any business which will show a return over variable or "out of pocket" cost and will therefore increase return on investment, should be taken if:

(a) It does not have an adverse effect upon selling prices, and
(b) No other business is available which will yield a greater return.

These decisions are relatively simple in the case of temporary accretions. The real problem is to determine accurately whether or not this is the true nature of the added business, because in the case of the latter type of business—a permanent addition to the line—the results are bound to be far reaching, and the decisions must be weighed with care. The "out of pocket" cost of the added volume now approaches normal cost, and it is short-sighted to neglect charging the incremental volume with its fair share of the fixed expenses of operating the business. It may be of some interest to discuss briefly the necessary steps in bringing out a new line. They might be somewhat as follows:

1. The Idea

A general outline made by the engineer, perhaps with rough sketches or outline drawings, would be compared, in so far as application and performance are concerned, with already existing products in the field. The sales manager, having an idea of what can be supplied, will make a very tentative market analysis which should indicate the volume possible of attainment and the price for which the device can be sold. (It should be emphasized that a halt is called at each stage of the analysis, no further work being done, if the result appears to be unsatisfactory, until work done to date

has been rechecked, and a suitable correction made. Only in this way can development expense be kept within bounds.)

2. Facilities and Cost Checked

Assuming that the review made by the sales department indicates a substantial demand for the product, the factory manager must make a rough check of facilities available to do the work. He must visualize manufacturing processes, decide which departments will do the job, estimate equipment and layout changes and deliver his opinion as to whether the product can be made satisfactorily. After this, a rough unit cost can be estimated which will take into consideration necessary expenditures for equipment, development and starting cost, as well as ultimate normal product cost. At this point the whole management group can check progress, and if a satisfactory profit is not indicated all preceding calculations must be carefully reviewed.

3. Working Model

Assuming that the project still seems to be a good one, preliminary drawings are made up and a sample or working model is constructed. This is primarily for the determination of commercial adaptability and acceptance, and the model must be subjected to the most vigorous performance tests, under actual or simulated operating conditions. If the sample comes up to expectations all work done up to this point is again reviewed in the light of this later knowledge. This is of tremendous importance, because up to this point a relatively small amount of money has been spent.

4. Plans for Manufacture

Assuming again that the venture seems profitable, the engineering and manufacturing departments lay all of their plans which include:

(a) Determination of general manufacturing methods, equipment and layout.
(b) Preliminary operation cards, detailing material, operation labor and tools and fixtures.
(c) Check of labor market to make sure operators are available.

(d) Secure quotations on important materials and parts.
(e) Manufacturing cost estimate.
(f) Production schedule—When can manufacture be started and when can required output be attained?

At this point the sales department can make definite commitments to its customers, and if substantial orders are obtained, appropriations are made up and approved for all necessary expenditures. Following this the engineering department prepares final drawings, builds additional samples if necessary, and issues an approved design.

5. MANUFACTURE

(a) Complete detailed planning for all parts, operations and assemblies; check all dimensions and tolerances.
(b) Manufacture a substantial number of tools and make samples to "prove in" the fixtures.
(c) Complete planned cost.
(d) Incorporate any last minute changes in design and planning, particularly of a cost nature.
(e) Order material in quantities, train operators, gradually increase production to scheduled level, with special attention to control of training expense and other starting costs.

MANAGEMENT VERSUS BUDGETARY CONTROL?

By J. William Schultze, Director of Banking, New York World's Fair, New York, N. Y.

YOU and I know that management today *includes* budgetry control and that there is no "versus." Yet there is a controversial situation, developed again and again among otherwise sane and normal colleagues in a business organization, which needs a little airing. If it were always an open battle—a good old knock down and drag out affair—the issues could be joined and settled. Generally, that's not the case. There is much friction, often silent but deep seated, which should be avoided to insure smoothly working control through budgets.

It is not budgetary control or a particular system that is being discussed here but the psychological influences which affect the success of budget making and budgetary control. How often does a production man or a sales manager blow up with "What does that juggler of figures know about running a plant or running a sales organization?" Perhaps you have also seen the morale of a whole organizatiton go down because of real or fancied interference with operating responsibilities by the budget department.

Where Does the Fault Lie?

It is recognized as axiomatic that management policy reaches its maximum usefulness when it is wholeheartedly supported throughout an organization. Budget work calls for all around respect because it is a worthwhile effort to co-ordinate income and outlay with a plan.

When the budget man and the rest of the organization do not see eye to eye in this matter, where does the fault lie? It is easy enough to reply with the assertion that others have not been educated to the value of budgetary control and simply must learn it. More open-minded study might reveal that the atmosphere unwittingly created in the approach to the subject is all wrong. When you deal with human beings, it is most unwise to ignore or underrate the psychological effect of what is said or done.

Budget work is the natural function of a trained accountant. Not only is it necessary that forecasts and budgets be summarized

into projected profit and loss statements, balance sheets and cash position estimates, but beyond that, the reports customarily and properly are prepared by the accounting organization.

Salesmanship Required

The accountant normally is not a salesman. If he is a good accountant he will strive to reflect figures and conditions impersonally, letting the chips fall where they may. This characteristic tends to militate against recognition of the human qualities which are factors in maintaining *esprit de corps* on a high level. This in no sense can be considered an indictment of the accounting profession or of accountants themselves. It is merely a frank observance of two characteristics which may not go together unless there is a conscious effort to unite them.

Both the idea of budgetary control and the particular mechanics to be employed in any given case must be sold to the organization. Selling an idea calls for the same type of salesmanship that you expect your salesmen to use in influencing customers. We can't write a course in salesmanship here—even if we knew how to do it. One important principle, however, can be laid down. If the plan itself is or appears to be the joint product of the responsible operating executives rather than something that is forced upon them, it will succeed if it is sound. It is the age-old sales principle of making the buyer feel that he is buying what he wants. What harm is done when the other man comes forth with an "original" idea which you carefully planted in his mind?

Who Is Responsible for Accomplishments?

Long before there was a grey hair upstairs, the writer (at that time a controller) bragged about his budget accomplishments. True enough, profits around the million dollar mark were within one per cent of the budget for several years. One might have assumed, from the prevailing attitude, that the controller was responsible for all that. Amusing! What were the sales and production forces doing? All that he did was to devise and put in motion the budget machinery. The others made the important prognostications—sales and production figures—and day after day did the work which made these figures come true. The introduction of

standards, to be sure, gave everyone a performance guide to shoot at. It followed that each wanted to be in the black. Therefore, sales and profits steadily improved. The co-ordination of estimates and the issue of comparative reports were important aids but, after all, they only told us where we were good and where we were bad. Others had to plug up the holes. These things were learned after the then controller became responsible for sales and production results and came to know how important budgeting can be and how destructive wrong budget tactics can be.

The Accountant Is Not a Judge

Another thing. It is difficult to obtain all around support when the budget officer steps out of his role and presumes to act as critic and judge of matters which lie outside his field. The head of an operating department, if he is worth his salt, justifiably feels that he is expected to know his business better than the head of the accounting or budget department. If the latter is wise, he will avoid any satement or act which has even a remote appearance of questioning the managerial ability of other department heads—even when he is sure that a condition is capable of improvement. It is better to find some way of letting the department head discover it for himself.

It is often necessary, in budget work, to make analytical studies of departmental details—perhaps comparisons between various periods or between similar units in the organization. This may require reference to operating statistics maintained by the department heads themselves. There seldom is difficulty in gaining access to this information if the matter is approached in an open, businesslike way. Indeed, the more enlightened executive welcomes such studies and comparisons and will co-operate in their preparation. It is a human trait to be vitally interested in the score and a characteristic of good management to want to know where the weak spots are, no matter who discovers them.

On the other hand, nothing will create antagonism and disrespect more quickly than gum shoeing and a seeming desire to be the fair-haired boy who shows up the other fellow's shortcomings. Often the result is a demoralizing let-him-find-it-if-he-can spirit throughout the organization. The budget officer has plenty of headaches without creating them himself.

Occasionally he is misled into an untenable position by his superior who, unconsciously, may place him in that spot. The better his work and the more confidence the budget man inspires, the easier it becomes to say, "See Jones and tell him that he doesn't need ten stenographers in the purchasing department."

When that happens, the boss is ducking his own responsibility. However, the budget officer still can exercise diplomacy. He can say that Mr. Smith has questioned the matter, or is sure to question it, or it is obligatory to call his attention to it. The trouble arises when he creates the impression that he himself is exercising super-management prerogatives instead of acting as a channel of information to the front office, on the one hand, and helping the operating executive to get his figures in such shape that they will avoid criticism, on the other hand. It is the latter phase particularly which tends to build internal good will and effective co-operation, if it is devoid of any appearance of expertism.

Lack of Co-operation

There are some cases, of course, where the budget activity is not much more than tolerated. It may be that the management has been persuaded that budgetary control is a necessary tool of management nowadays—"the thing to do." It may have been adopted on that basis without too much conviction as to its usefulness. If this were not so, comments like, "We need a budget but, after all, a budget does not bring in the orders," would not be made.

Perhaps in a larger number of cases where the budget man encounters lack of co-operation, the top man fully recognizes the value of budgetary control, relies upon it and supports it actively, but one or two important executives just are not budget-minded. A brilliant sales executive may be worth his weight in gold, but he might and probably would be completely out of patience with any attempt to regiment his work budgetwise. You can hardly expect him to be overly impressed with a restricted budget provision for promotion expenses when a winning idea comes along—such an idea as, shall we say, a "Pot of Gold" program.

Overcoming Difficulties

These need not be discouraging difficulties. There are always ways of meeting them. Perhaps the budget should be revised. Per-

haps the sales executive should be furnished with an assistant to do the paper work. Time also is a great teacher. A number of instances come to mind in which this was the case. In one, the sales executive could not be induced to supply his own estimates; so estimates were made for him. When his performance fell short he rebelled at the estimates but he could not successfully deny that he had been asked for the estimated figures and had failed to produce them. After a while he became the most enthusiastic estimator in the place and was ready with his figures before any one else.

In another case, the factory manager, operating two plants, was merely downright stubborn. He supplied the required figures, the budgets were made and reports were issued, but he insisted that they were of no value to him. To test this, his copy of one of the monthly reports was held back purposely. Within forty-eight hours after the usual time of its issue he started clamoring for it. After receiving a few evasive excuses, he lodged a complaint with the president. Thereafter, there was no further assertion that the reports were not useful.

It is true, of course, that there are still many able executives who do not respond enthusiastically to budgetary control. They will cite failures in proof of their objections. Although some of these unfortunate cases were the result of over-optimism in sales or other estimates and some were caused by sudden economic changes, it is the writer's experience that in most cases there is an inner antagonism engendered by a series of irritating incidents such as have been mentioned in these comments.

The budget officer can smooth his own path and can create at least an interested, if not enthusiastic, attitude toward budgetary control if he will add to his bag of tricks the application of a little sound psychology.

THE CONTROL OF CAPITAL EXPENDITURES AND THE RETURN ON CAPITAL INVESTMENT

By E. E. Lewis, Administrator of Accounts and Finance, RCA Manufacturing Co., Camden, N. J.

DURING this discussion on the subject, "The Control of Capital Expenditures and Return on Capital Investment," we shall assume that we are localizing capital investment to fixed assets such as land, buildings and plant facilities.

The establishment of property records as a medium of control of capital expenditures, and as a basis for computing depreciation, can only serve as an auxiliary to good business judgment.

Fundamentally, the problem begins by determining how much investment should be made in order to create a profit in the goods which are produced by the investment. The purchase of certain facilities without consideration of the effect on other equipment may result in an unbalanced investment which will create idle equipment or excess costs. The effect thereof increases costs by a direct charge against profits and places the company in an unsatisfactory competitive position.

To illustrate the point: The procurement of additional automatic screw machines without consideration of the productive ability of the machines in performing subsequent operations, i. e., milling or grinding, does not permit of greater output of the goods which return profit, but rather stores up partially processed parts which require storage and handling, and an additional investment in machinery. Production is subsequently held up in the screw machine section, thus creating idle time. On the other hand, the new screw machines may process parts to closer tolerances, thus eliminating subsequent grinding operations.

First Essentials

Hence, the first essentials in controlling capital expenditures are a study of—

1. The reasonable share of the total business that would be available to the individual concern,

2. The numerous operations and process required in the fabrication of the product,
3. The machines and supporting facilities required to perform the various operations and processes, and
4. The time required to perform each process and assembly, including reasonable time allowances for changing of tools, breakdowns and other normal manufacturing delays.

The development of this thinking should result in a statement showing the number of machines, supporting facilities, and floor space with an evaluation of the costs thereof, and should definitely indicate to management the capital required to attain a balanced investment as related to the volume of business required to warrant the expenditure.

Uses of Equipment Records

The nature and scope of plant and equipment records should be consistent with the nature of the business and the objectives to be served. The general uses may be summarized:

1. As details to support the total amount of the investment shown in the balance sheet.
2. As a basis for computing investment involved in various products fabricated by the company.
3. To serve as a means for computing depreciation and to support deductions from taxable earnings.
4. To provide means for appraising the relative merits of alternative types of equipment.
5. To provide a basis for insurance and discussion of property taxes.

In determining the scope and uses of the records, consideration should be given to segregatiton of the investment into classifications and departmental breakdowns. The degree of the detail of these will vary with the type and size of the business. With regard to the former, the Uniform Accounting Manual of the Electrical Manufacturing Industry suggests the following:

Land
Grading and assessments
Buildings and structures
  Buildings
  Structures
  General service piping and wiring
Machinery and tools
  Machinery
  Electrical apparatus
  Ovens and furnaces
  Conveyor equipment
  Small tools (normal inventory)
  Electrical apparatus
Foundations and installation
Furniture and fixtures
Transportation system
Property other than manufacturing plant

The extent to which the plant records segregate the investment by departments depends largely upon the need for the information to control departmental rates of overhead upon the variations in the processes and upon competitive conditions. The latter frequently demand the calculation of all costs, including investment and its depreciation, in a manner that will then permit the calculation of true costs of the article which must be sold under competitive conditions. This is also essential to permit comparison of manufactured goods with quotations from outside suppliers.

Initiating Expenditures

Apart from the records and routine that may be established to effect control of capital expenditures, the viewpoint, training and ability of the personnel responsible for the initial consideration of the merit in the request for acquirement of new capital items, deserves very serious consideration.

Frequently foremen or department heads desire the latest and often the most expensive equipment, which may be due to a sense of pride in possession. However, the economic need must be carefully evaluated. Therefore, it would be most desirable to place the responsibility for the initial consideration of the worthiness of capital expenditures with a division disassociated from manufacturing activities but experienced in financial values and

having sufficient experience to obtain and weigh all elements of the problem.

An approach to a reasonable control may involve the issuance of annual or semi-annual budgets for all plant expenditures. This issuance should be subject to the approval of management and the board of directors. Although careful consideration should be given in projecting these budgets, it is not expected that each individual facility can be accurately determined. Such budgets indicate the overall expenditures that are contemplated and they are given consideration in budgeting the financial operations of the company.

Suggested Procedure

As a more direct control of capital expenditures, the following procedure may be efficacious:

1. As the result of an idea created by a foreman, design-engineer or process-engineer, time-study man, direct workers or others, that the acquirement of a new facility would result in lower cost, higher quality or increased output, a recommendation is forwarded to the plant methods and development section.
2. The suggestion is studied, and if it is found to hold promise, specifications and (wherever necessary) outline drawings are issued by the plant methods and development section which, together with a "Request for Estimate," is forwarded to the plant accounting section.
3. The estimator associated with the plant accounting section calculates the cost of the facility and collaborates with the time study section in determining the direct labor savings. He also determines whether the type of expenditure warrants a capital or expense classification. The aforementioned estimator also considers the need for the facility in the light of production requirements and proper balance with other equipment.
4. The results of the aforegoing study are summarized on a request for estimates which is then returned to the manager of the division directly affected by the project, together with the recommendation of the plant accounting section.
5. If the divisional manager approves the project, the request for estimate is returned to the plant accounting section and

serves as authorization for issuance of an "Appropriation Request."

6. The appropriation request contains the following information: amount, expected savings, reasons, classification of expenditures (capital or expense), and value of abandoned equipment. It is forwarded for proper approvals to: Division Manager, if up to $300. Department Manager, if from $301 to $750. Department Manager and Executive Vice President, if over $750.
7. An approved request for appropriation permits of the release of works orders and requisitions for purchases, by the plant accounting section.
8. Copy of the approved requests is forwarded to the general or works accounting section and is used for the following purposes:
   a. For acceptance of charges which are accumulated and compared monthly.
      (Note—When expenditures equal 75 per cent of allowed amount, the divisional manager is notified.)
   b. To obtain appropriation for expenditure in excess of amounts originally allowed.
   c. To check the material costs and the labor rates established for processes performed by the new facility in order to determine whether they are in accordance with the savings originally contemplated.

The compilation of the estimates for capital expenditures by the plant accounting section—divorced from the maintenance, plant installation and purchasing sections—serves as an effective instrument for controlling expenditures and measuring the effectiveness or efficiency of the sections directly involved in the procurement and installation of the facilities.

It has been found that a periodical summarization of use of facilities serves as a valuable guide in judging the need for additional equipment or in judging whether excess or abnormal idleness of facilities exist. This may be accomplished by the listing of various machines and other facilites in certain important sections during a period of normal production and comparing available hours with used hours as illustrated in Exhibit 1.

EXHIBIT 1.

MACHINE UTILIZATION

Dept. .....

Number of Machines		*Total Available Productive Hours Per Month*	*Total Normal Productive Hours Per Month*	*Actual Productive Hours Per Month*	*Idle Hours Per Month*
Type & Description	*Number*				
#00 B. & S Auto. Screw Machine....	16	No. of machines times 40 hours times no. of working days in month	Total Available Productive Hours less "down" time for set-up, repairs, and normal maintenance	Actual Working time of machines for the month	Actual hours less normal productive hours
# 2 B. & S. Auto. Screw Machine....	5				

A. The aforegoing serves to estop purchases of new equipment when existing facilities are not being used to normal extent.

B. It stimulates inquiry as to cause of idleness. This may be due to excessive breakdown, caused by age, or by improper maintenance.

C. It may permit of disposition of excess facilities, thus reducing fixed charges and increasing cash balance.

Return In Investment

With regard to the problem of return on capital investment, it is my opinion that this presents an imponderable, for there is no one satisfactory, scientific answer. Returns which are measured by the profitableness of investment are not earned wholly by the productive effort of the innate items of investment but largely by the effectiveness of the management of the business. This involves men, machines, material merchandising and all the ramified operations that are involved in the industrial program of doing business.

Another complex phase is created by obsolescence in equipment, new developments in products fabricated by the equipment, saturation points in consumer markets, effect on purchasing power of cyclical trends in economic cycles, and abnormal requirements created by war conditions.

In considering return on investment, the purpose of the investment plays an important role. Is the expenditure to be incurred for replacements or additional facilities? In considering the problem, various elements must be examined. Some of them are:

Cost of new facility.

Gross book (undepreciated) value of existing equipment, less resale value.

Cost of output, old and new.

Maintenance and depreciation.

Taxes, insurance and floor space.

An Example

Let us look at a very simple problem involving Annual Cost:

		Old	*New*
First Cost		$10,000	$7,500
Undepreciated balance	$5,000		
Plus removal costs	500		
Less resale value	1,500		
Net loss		$4,000	

OPERATING COSTS		
Direct labor	1,800	$1,800
Maintenance, supplies, power, floor space, etc. (average)	900	700
Taxes, insurance	100	75
Depreciation @ 10%	1,000	750
Interest @ 5%	500	375
	$4,300	$3,700
Cost per unit	$.043	$.026

EXPECTED BENEFITS:	
Assuming ten year life ($4,300—$3,700×10) =	$6,000
Less undepreciated balance and removal costs of existing machine, reduced by resale value	4,000
Net gain	$2,000
Per cent of first cost of new investment	26.6%

Other Considerations

This result may indicate that the investment is warranted, particularly if the part fabricated by the machine enters into a product that must be sold in a competitive market, so that reduced costs are vitally essential.

However, if the machine is to produce a part that enters into a product having a potentially short life (because of market conditions, or change in design of the product or equipment), it would be financially risky to assume a liquidation of use over a normal life. In the illustration we assumed a 10 per cent rate or a ten-year life. If conditions indicated that the probable usefulness of the machine was to be no longer than two years, then it would be illogical to make the investment, unless pressure of competition should make it necessary.

Ordinarily, it would be wise, or at least conservative, to assume an absorption of the initial investment in three to four years when dealing with standard machinery (less its expected resale value) and to assume a shorter-term absorption when the proposition involves equipment subject to rapid change, when the equipment is to be used to fabricate products for a market subject to numerous changes in use or design, or for a market directly affected by economic change.

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Good Judgment Replaces Formulas Where Future Uncertain

Progress of this country has been stimulated by new products, new forms, new conveniences. Pioneering not only in the development of home and farm lands but also in the sciences and industry, has kept us alert and everchanging. Competition, which created a large supply of the red corpuscles flowing through the blood stream of American industry, moved in step with new developments in creating the need for new ideas in designing, processing, assembling and packaging our products.

Consider the rapid changes in design of the various components of an automobile. Consider the streamlining of trains. Consider the advances in aircraft manufacture; in line power plants replacing radial engines, and fabric wings giving way to riveted metal ones—these, perhaps, to be next supplanted by wings of formed plastic.

There are thousands of such illustrations. They emphasize that no formulas or rules serve as effective substitutes for good judgment in evaluating the life of usable equipment when return of investment in capital assets is being considered.

If this judgment dictates that only a short life of use can be anticipated, it does not follow that the rate at which we depreciate or absorb the investment in costs will be consistent with such life. Ordinarily, competition, or the need for creation of markets, will demand the use of a rate based upon a longer (or normal) life. However, this contribution to meet competition, or new markets, will create the financial returns that will permit of setting aside a portion of such returns in the form of specific reserves which are to be held to offset the losses that may be sustained in disposing of the facilities after their usefulness has expired. Presumably, this practice is being followed by conservative management.

Can a formula or rule even be imagined that could establish a rate, or means, to logically measure a proper return on capital invested, when you consider the risks and variables that enter into the problem? I cannot comprehend an affirmative reply. Only good judgment which weighs all the facts (tempered with as much conservatism as a good financial policy and regulations permit) can give us the most practical answer.